

REMARKS

This is a response to the *Final Office Action* dated April 7, 2003. Claims 7-11 and 21-47 are pending in the present application and claims 21-47 have been allowed. Reconsideration and allowance of outstanding claims 7-11 in view of the following remarks are requested.

The Examiner has rejected claim 7 under 35 USC §102(e) as being anticipated by U.S. patent number 6,146,959 to DeBoer et al ("DeBoer"). For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by independent claim 7, is patentably distinguishable over DeBoer.

The present invention, as defined by independent claim 7, teaches a capacitor comprising a ceramic tantalum nitride dielectric situated between a first capacitor electrode and a second capacitor electrode. As disclosed in the present application, the present invention achieves ceramic tantalum nitride by fabricating tantalum nitride with a nitrogen content of greater than 30%. In the ceramic mode, tantalum nitride exhibits a high dielectric constant, which allows the present invention to utilize fabricated ceramic tantalum nitride as a dielectric to advantageously achieve a capacitor having a relatively high capacitance density. Furthermore, as disclosed in the present application, the present invention's capacitor can be advantageously fabricated in a single ionized metal plasma ("IMP") tool without having to remove the semiconductor wafer from the IMP tool for fabrication of a dielectric layer comprising ceramic tantalum nitride.

In contrast, DeBoer does not teach, disclose, or suggest a capacitor comprising a ceramic tantalum nitride dielectric. DeBoer specifically discloses capacitor 10, which comprises Ta_2O_5 , i.e. tantalum pentoxide, layer 18 situated between silicon nitride layer 16 and second nitride layer 20. See, for example, column 1, lines 56-67, column 2, lines 16-17 and Figure 1 of DeBoer. In DeBoer, silicon nitride layer 16 and second nitride layer 20 are situated between first capacitor plate 12 and second capacitor plate 22. See, for example, column 2, lines 16-22 and Figure 1 of DeBoer. DeBoer further discloses that tantalum pentoxide is generally amorphous if formed below 600°C and will be crystalline if formed, or later processed, at or above 600°C . See, for example, column 2, lines 9-11. However, as discussed above, ceramic tantalum nitride is formed in the present invention by fabricating tantalum nitride with a nitrogen content greater than 30%. In contrast, DeBoer discloses fabricating tantalum pentoxide at a temperature below 600°C to form amorphous tantalum pentoxide, which is different than ceramic tantalum nitride. Thus, DeBoer does not teach, disclose, or suggest forming ceramic tantalum nitride.

For the foregoing reasons, Applicant respectfully submits that the present invention, as defined by independent claim 7, is not suggested, disclosed, or taught by DeBoer. As such, the present invention, as defined by independent claim 7, is patentably distinguishable over DeBoer.

The Examiner has further rejected claims 8 and 9 under 35 USC §103(a) as being unpatentable over DeBoer in view of U.S. patent number 5,170,318 to Catala et al


(“Catala”). As discussed above, independent claim 7 is patentably distinguishable over DeBoer and, as such, claims 8 and 9 depending from independent claim 7 are, *a fortiori*, also patentably distinguishable over DeBoer for at least the reasons presented above and also for additional limitations contained in each dependent claim. Moreover, the features of independent claim 7, for example a dielectric comprising ceramic tantalum nitride situated between a first and second capacitor electrode, are not suggested, disclosed, or taught anywhere in Catala. As such, independent claim 7 as well as claims 8 and 9 depending therefrom are also patentably distinguishable over DeBoer in combination with Catala.

The Examiner has further rejected claims 10 and 11 under 35 USC §103(a) as being unpatentable over DeBoer. As discussed above, independent claim 7 is patentably distinguishable over DeBoer and, as such, claims 10 and 11 depending from independent claim 7 are, *a fortiori*, also patentably distinguishable over DeBoer for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Based on the foregoing reasons, the present invention, as defined by independent claim 7, and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 7-11 are patentably distinguishable over the art cited by the Examiner. For all the foregoing reasons, an early allowance of outstanding claims 7-11 and an early Notice of Allowance for all pending claims 7-11 and 21-47 is respectfully requested.

Respectfully Submitted,
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